

BOOK REVIEWS.

THE ORIGIN, VARIATION, IMMUNITY AND BREEDING OF CULTIVATED PLANTS. By N. I. Vavilov. Translated by K. Starr Chester. Pp. 1-366 with 37 illustrations. Waltham, Mass.: The Chronica Botanica Co. London, W.C. 2: Wm. Dawson & Sons, Ltd. \$7.50.

In his all too short lifetime N. I. Vavilov made many important contributions to the study of plant life. His unbounded energy coupled with a keen and original mind, combined to make him one of the foremost scientists of his age. The world at large is infinitely the poorer for his premature death which is presumed to have occurred early in 1942. Though Vavilov had a mastery of many languages it is natural that most of his publications were made through the medium of Russian, his mother tongue. On this account many of his important contributions to science have remained inaccessible to the majority of scientific workers. The present volume is therefore sure of a welcome for Vavilov's writings have more than an ephemeral interest. His contributions to plant breeding, the origin of cultivated plants and many kindred subjects are well known, but here for the first time they are made available to English-speaking students in their entirety.

The longest of the five papers in this volume is "The Scientific Bases of Wheat Breeding". In this the author has dealt exhaustively with a subject in the development of which he played a leading part. Next in size comes "Study of Immunity of Plants from Infectious Diseases", another subject of great practical importance to agriculture. The remaining papers are shorter but they too deal with topics of interest. One entitled "The Law of Homologous Series in the Inheritance of Variability" may be read with advantage by every student of plant life. It is a law so simple and yet so significant for workers on plant classification that one feels surprised at the neglect it has so often suffered in the past. Vavilov's first communication on this subject was made in English in the *Journal of Genetics* in 1922. In the volume under review the translation has been made from a Russian version written in 1935 and incorporating some new material.

There are a few minor criticisms. A statement of the place and date of publication of each paper would have added to the general interest. Some of the illustrations are less good than they were in the original, probably largely due to the fact that in these cases the originals were in colour and the present ones are not. Fig. 3 loses much of its clarity when reproduced in black and white. The same is true of the map given in

Fig. 8: in the original the centres of origin of cultivated plants stand out clearly but here they are obscured by the rather heavy shading used to indicate altitudinal differences.

These criticisms, however, are of slight importance when considering the volume as a whole. Serious students are much indebted to the *Chronica Botanica* Co. for making these classics of the scientific world available in such an excellent translation.

M. R. LEVYNS.

BOTANICAL SURVEY OF S. AFRICA. Memoir 23. THE VEGETATION OF WEENEN COUNTY, NATAL. By O. West. 1950. Memoir 24. AN ECOLOGICAL ACCOUNT OF THE VEGETATION OF THE POTCHEFSTROOM AREA. By W. J. Louw. 1951.

It is a matter of some importance that accounts of the vegetation of two important agricultural districts in the country should appear in close succession and one hopes that this may be an augury that more scientific methods may become used in the management and exploitation of the veld instead of the too common short-sighted and destructive procedures so often followed.

The two areas described in these papers are alike in that grassland forms the main vegetation type but otherwise are dissimilar in the topography, climate, and relationships of the vegetation. In both papers rather full accounts are given of the local topography, geology, and climate. In West's paper these data are especially full and include under climate a number of most useful features which are not often available.

(1) West's paper on Weenen county is undoubtedly a real contribution to the understanding of vegetation and its management. The area is essentially a series of steps on the eastern slope of the Drakensberg escarpment descending from the mountain tops to the river valleys at about 3,000 ft. Within the area three main vegetation types are recognized, Alpine, Evergreen (Mountain) Forest, and Semi-deciduous Bush. In the treatment of these attention is focussed on the history of the area and the activities of the human population both native and other. It is a matter of interest and importance that the author reaches the conclusion that grassland with the possible exception of the alpine types, is derivative and dependant on interference either by fire or by grazing or both. Evidence in support of this was obtained from direct observation and from the results of a number of long-term experiments. The account of the grassland in this paper and of its relations is both full and clear. Throughout the paper stress is laid on the dynamic aspects and the relationships to management.

The paper is illustrated by a large number of photographs which have been carefully selected but of which the reproduction is in many cases so poor that details are obscured.

(2) The paper by Louw on the Potchefstroom area is, in spite of its more high-sounding title, a much slighter and less important one. The treatment throughout is rather static with emphasis on floristic and some biological aspects. There is little on the relationships of the vegetation itself. The description is based on the main habitat conditions but the dynamic side is not brought out. Some attention is given to the deterioration resulting from burning, overgrazing or faulty methods of farming, but this aspect is not given the amount of detail that its importance would warrant. The discussion on economic and agricultural aspects is much lacking in this direction. The illustrative photographs are good and in general are better reproduced than in the other paper.

It is a matter of slight regret that neither author includes a vegetation map. West gives an orographical one, Louw a topographical, an orographical and a geological one. A map illustrating the existing condition of the plant communities would have made the findings much clearer to the reader with no local knowledge.

R. S. ADAMSON.

AN INTRODUCTION TO THE EMBRYOLOGY OF THE ANGIOSPERMS. By P. Maheshwari. New York, Toronto, London. McGraw Hill Book Co. 1950. Pp. x+453, figs. 216. 52/-.

PLANT EMBRYOLOGY: EMBRYOGENY OF THE SPERMATOPHYTES. By D. A. Johansen. Waltham, Mass.: Chronica Botanica Co. Johannesburg: Central News Agency. 1951. Pp. xviii+306, figs. 80. \$6.00. (Special interleaved half-leather-bound edition \$14.00.)

It is strange that since Coulter and Chamberlain published their classical text book *The Morphology of Angiosperms* in 1903, no comparable synthetic study in English of the embryology of the flowering plants has been written until the present two volumes, both of which have appeared during the last two years.

Maheshwari's book follows the Coulter-Chamberlain plan rather closely, and covers all the developmental processes of the male and female gametophytes, fertilization and the early stages of the formation of embryo and endosperm, as well as giving some account of such relevant subjects as the structure of the style, nucellus and integuments, etc. Johansen's book, on the other hand, deals strictly with embryogeny: that is, the early development of the embryo itself, starting from the zygote.

Johansen's book, with its narrow scope, goes into the details of successive cell-divisions in the embryo, and puts forward a system of

classification of types of embryogeny, largely based on Schnarf and expressed by shorthand formulae. The sequence and direction of the early segmentations of the zygote are the principal theme of the largest section of the book, viz., that dealing with the Anthophyta: and a number of "embryonomic laws" governing early development are stated. Six principal Types are distinguished: in one of these, the Piperad Type, the first cell wall is "essentially longitudinal"; in the other five types it is transverse. In two of these the terminal cell divides by a longitudinal wall, in the other three by a transverse wall: the varying behaviour of the basal cell being the criterion for their further classification. These Types are subject to many Variations, based on subsequent cell-divisions.

While this formal mode of classification may be useful in dealing with descriptive embryogeny, it appears to bear very little relationship to Angiosperm systematics in the wider sense. Johansen arranges his subject matter under families: but several distinct Types and Variations may occur within any single family: for example, the few Gentianales which have been studied fall into three of his Types—the Solanad, Caryophyllad and Asterad. Conversely, each Type occurs in widely separated parts of the natural system: for instance the Onagrad Type has Variations named after such diverse genera as *Capsella*, *Euphorbia*, *Lythrum*, *Mentha*, *Lotus*, *Catalpa*, *Lilium* and several others. Clearly, embryogeny can only be used as an indication of relationship with the greatest caution.

A valuable section of Johansen's book deals with the Gymnosperms, whose embryogeny has a peculiar interest which is not, perhaps, shared by the Angiosperms. Here we do not find the same obsession with Types, and the descriptions and illustrations are clearer and more objective. The larger section on the Angiosperms is useful as indicating the studies that have been made and calling attention to the gaps in embryological knowledge of that vast group: but the impression is given that no sensational results are likely to follow from the filling of the gaps.

The book as a whole is a thoroughgoing descriptive account of a special field, unilluminated by experimental study or phylogenetic theory: as such it will serve for reference rather than for stimulus.

Maheshwari's volume, with its much wider subject matter, may be regarded as a text-book of comparative morphology, and as such it merits very high praise, from the standpoints both of the advanced student and of the research worker. It is a very readable survey, selecting what is essential and presenting the various phases of life history with admirable clarity and succinctness: the figures are numerous, most of them being redrawn in good style and fully illustrating and explaining

the text: the bibliography is copious and references given in the text will lead the student to the original sources of information.

While the greater part of the book is factual and descriptive, the final chapters are noteworthy presentations of the more recent developments in the field.

One chapter deals with the contribution that comparative embryology can make to the perennially interesting and fundamental study of taxonomy and phylogeny. Examples are given of the way in which embryology may settle the systematic position of a genus or family of problematical affinities. The Empetraceae, for example, have been associated by various authors with such diverse families as the Euphorbiaceae, Celastraceae and Ericaceae: embryology definitely establishes their relationship with the Ericaceae. The Cactaceae have been variously associated with the Centrospermae, Passifloraceae and Cucurbitaceae: the embryological data place them in the first group as a sort of bridge between the Aizoaceae and Portulacaceae.

Another chapter presents the main lines of modern experimental research on embryological phases of life history. Here we find accounts of test-tube cultures of embryos with an analysis of the chemical and physical factors involved: this has been of practical use in securing the development of otherwise non-viable hybrids in *Prunus* and in accelerating the production of seedlings in *Iris* hybrids, where a two years resting period usually occurs before germination. Other topics are induced parthenogenesis; the production of adventive embryos; and the induction of parthenocarpy, or fruit formation without fertilization—a subject of great potential economic importance, already realized in the case of winter tomatoes.

A final chapter deals with the theoretical aspects of embryology from the phylogenetic point of view. The Gnetalean origin of the Angiosperms is favoured: the two-archegonia theory of the 8-nucleate embryo-sac is rejected: the endosperm is discussed, but its morphology remains problematical: brief mention is made of the Dicot and Monocot types of seedling, but the Angiosperms are judged to be certainly monophyletic.

Maheshwari's book is an admirable presentation of the subject and should be widely welcomed.

R. H. COMPTON.

WILD FLOWERS OF THE CAPE OF GOOD HOPE. By E. Garrett Rice and R. H. Compton. With a foreword by Field-Marshal J. C. Smuts. Cape Town. Bot. Soc. of S. Afr., 1951. Pp. 24 and 250 col. plates. 50s.

This is a most delightful and attractive picture book and one which will be very much welcomed by lovers of the beauties of our flora. It consists essentially of 250 coloured plates by Mrs. Garrett Rice. These

plates illustrate no less than 444 species and are drawn life-size. The plates themselves are most pleasing and for the most part are both artistic and accurate. A few suffer from a certain degree of artistic fuzziness in detail. The reproduction is on the whole excellent. There is a certain loss of colour and brilliance especially in scarlet and orange tones. The species illustrated are named, and notes are given on the localities where the plants are found, their form and time of flowering. These notes, together with some details on the origin of the work, are elaborated in the introductory part.

The volume has a characteristic foreword by the late General Smuts. This foreword was, indeed, one of the last things he wrote and will in time to come be looked upon as a valuable part of the volume.

The species illustrated seem to have been collected without any definite plan. They provide a random sample of the more conspicuous part of the flora. This random sampling renders the botanical value of the book negligible but it was not produced for botanists but for that large public which has a general interest in our flora but neither the time nor the desire for detailed study. For these it is very much what has been demanded for a long time.

The Botanical Society is to be congratulated on having undertaken the publication of this book which will surely be prized by a large public. For visitors to the Cape it will be both a most welcome addition to the few works available and a most attractive souvenir. The price for such a book is remarkably low.

R. S. ADAMSON.

THE GENERA OF SOUTH AFRICAN PLANTS. By E. P. Phillips. 2nd edition. Pretoria. Bot. Survey Mem. 25. Govt. Printer. 1951. Pp. 923. 40s.

This is a new and enlarged edition of a work well known to botanists and students. The first edition which was published in 1926 has been out-of-print for several years. This new edition is much enlarged, extending to 923 pages as compared with 702 in the original. The general plan is the same as in the first edition and need not be recapitulated. This extends to the extent of quoting the serial numbers of genera used by Della Torre and Harms even where these go against more recent views. The increase in size is in the main due to the inclusion of 114 genera which did not appear in the first edition. Some of these are the result of more intensive exploration of the flora, some the result of rearrangements and the splitting up of older large genera.

Welcome and most useful innovations in this edition are the citations of the sources of the original descriptions, and in most cases the quotation of the type species.

The size of the volume brings out the immense diversity of the South African flora. The most casual study of the notes on the distribution of the genera also emphasizes the very great diversity in the floras of the different parts of the country. When these features are realized, one is forced to admire the courage and energy of the author in attempting the task he has undertaken. In dealing with such a huge and diverse assemblage of plants it is inevitable that a certain degree of inequality of treatment occur and that a certain fraction must be of the nature of a compilation from the work of others. No one can be equally familiar with all the floras in the country, and a reader who is especially familiar with any one will certainly find errors of omission or commission in his special field.

As an example of the diversity of treatment the somewhat excessive splitting of genera in Thymelaeaceae and in the *Mesembryanthemum* group in Aizoaceae stand in contrast to the grouping of genera under *Lobelia* or *Tetradlea*.

The author's treatment of genera described or segregated since the first edition is individual. In many cases notes have been added to the descriptions giving an alternative connotation. In others an arbitrary line is taken. For example, several of Lewis' rearrangements in Iridaceae are not accepted; *Acidanthera* which she claimed was not represented in this country is retained. Further in Restionaceae the scheme of Pillans is accepted with no reference to the rearranged genera of Gilg-Benedict. In his preface the author mentions that he has not personally studied the segregates of *Mesembryanthemum*. These which occupy 26 pages are certainly the least satisfactory part of the book.

On the much vexed question of the omission or inclusion of alien genera, again the author takes up an individual line. Many such are included in Caryophyllaceae or in Cruciferae but none in Malvaceae. *Argemone* is included but one looks in vain for *Erodium*.

As however no two systematists agree wholly on any system of classification, it is an easy matter to find faults. Taking the book as a whole, this edition is undoubtedly a much better work than the original one. An immense amount of trouble has been taken to bring it up to date, an impossible task, and to eliminate errors. A superficial comparison with an annotated copy of edition 1 shows that a large number of errors have been eliminated. The keys both to the families and to the genera in each family have been largely recast. These are based on generally obvious features. In most cases one or at most two contrasting characters are used, an oversimplification which leads to uncertainty in many of the larger families. Especially for students and beginners it would have been an improvement if the key to the families had been sectioned. The

chances of error in a key with 796 divisions and one which extends over 45 pages are very large.

The book is clearly printed and well got up. The type is clearer than that in edition 1. There do not seem an excessive number of misprints. It is certainly a volume that should be in any botanical library in this country and is one that will be a very useful source of reference. For its size the price is reasonable.

R. S. ADAMSON.